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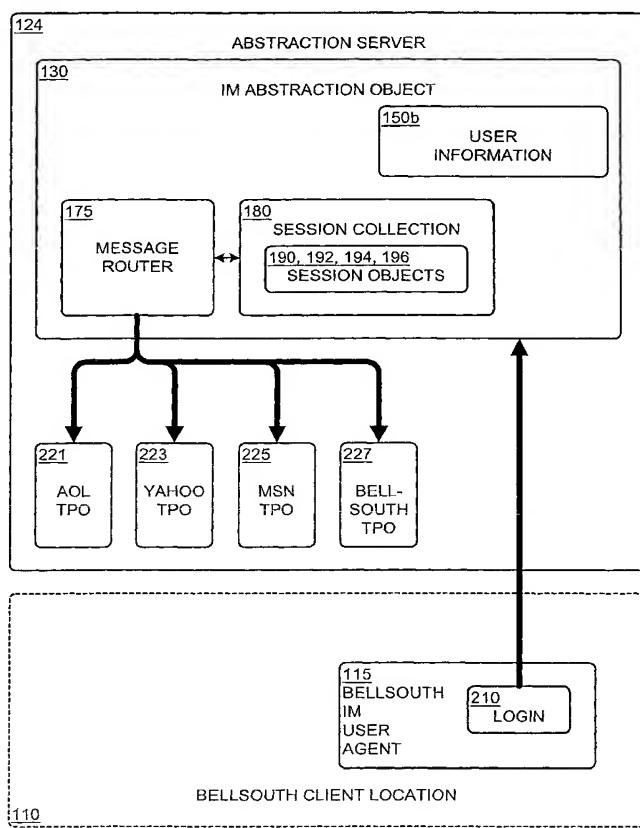
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(54) Title: SERVER-BASED MESSAGE PROTOCOL TRANSLATION



(57) Abstract: A system and method are presented in which a plurality of transport protocol objects (TPOs) are instantiated at a server. In one embodiment, each of the plurality of TPOs is adapted to provide a translation between a first IM protocol and a different IM protocol.

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**SERVER-BASED MESSAGE PROTOCOL TRANSLATION****CROSS-REFERENCE TO RELATED APPLICATIONS**

This application claims the benefit of U.S. provisional patent application serial number 60/411,336, filed September 17, 2002, which is incorporated herein by reference in its entirety. Additionally, this application claims the benefit of U.S. provisional patent application filed on October 17, 2002, having Express Mail mailing label number 924321225 US, which is incorporated herein by reference in its entirety.

**10 FIELD OF DISCLOSURE**

The present disclosure relates generally to the Internet and, more particularly, to systems and methods for providing interoperability between various Internet protocols.

**BACKGROUND**

15 In recent years, the Internet community has grown at an astounding rate. Similarly, the number of products directed to the Internet has grown concomitantly with the dramatic growth of the Internet community. Among the products directed to the Internet are email products, instant messaging (IM) products, video conferencing products, voice-over-Internet protocol (VoIP) products, and many more products that 20 employ the Internet as the backbone for their operations.

The rapid expansion of Internet-directed products is generating an accompanying increase in the sophistication of Internet users, which is, in turn, generating a further expansion of products directed to the Internet. This positive-feedback cycle results in various vendors launching their own Internet products using various technologies that are 25 conducive to fast capitalization of such an expanding market. Thus, while many of the products from the various vendors provide largely similar services, the discrepant

technologies used by the various vendors produce problems of interoperability between the various products. For example, while vendors such as Microsoft, Yahoo, and America On-Line (AOL) provide relatively similar instant messaging (IM) services, the underlying protocols employed by the various vendors differ vastly. Thus, in order for

5 Microsoft's IM product to communicate with Yahoo's IM product, the underlying protocol must be translated from Microsoft's protocol to Yahoo's protocol. Similarly, in order for Microsoft's IM product to communicate with AOL's IM product, another translation must occur between Microsoft's protocol and AOL's protocol. As one can see, for interoperability between protocols used by the various vendors, a translation must

10 exist for each protocol for which there is desired interoperability.

Thus, in the past, each IM service had a translation protocol for as many other IM services to which it sought to provide interoperability. Unfortunately, since all communications with a particular service was routed from server to server for this type of approach, any failure in the path resulted in loss of all messaging with a particular 15 service. Additionally, a failure in the server often resulted in loss of all services provided by that server. Moreover, because all messages to other services were routed through the server, the server was required to process all of the messages to all of the services, thereby resulting in greater delays in all services.

In view of this incompatibility among the various vendors, the Internet 20 Engineering Task Force (IETF) began soliciting input from the Internet community to address the problems of incompatibility. This resulted in the adoption of several recommendations by the IETF. For example, Request for Comments (RFC) 2778 and RFC 2779 provide guidelines for presence and IM. However, apart from general features associated with IM, RFC 2778 and RFC 2779 provide very little instruction for actually 25 implementing IM by various vendors.

This lack of instruction resulted in further study by members of the IETF, who published several memos and recommendations for Common Presence and Instant Messaging (CPIM). However, the IETF efforts only address a fraction of the problems dealing with interoperability.

5 Thus, a heretofore-unaddressed need exists in the industry to address the aforementioned deficiencies and inadequacies.

## SUMMARY

The present disclosure provides systems and methods for providing  
10 interoperability between various Internet protocols.

Briefly described, in architecture, one embodiment of the system comprises a server, and a plurality of transport protocol objects (TPOs) instantiated at the server. In one embodiment, each of the plurality of TPOs is adapted to provide a translation between a first IM protocol and a different IM protocol.

15 The present disclosure also provides methods for providing interoperability between various Internet protocols. In this regard, one embodiment of the method comprises the steps of instantiating a plurality of transport protocol objects (TPOs) at a server, establishing a plurality of connections between the plurality of TPOs and a plurality of servers, and providing a communication pathway between an IM client and  
20 the plurality of servers through the plurality of instantiated TPOs. In one embodiment, each of the plurality of TPOs is adapted to provide a translation between a first IM protocol and a different IM protocol. The IM client transmits and receives IM messages using the first IM protocol, while each of the plurality of servers transmits and receives IM messages using one of the different IM protocols.

Other systems, methods, features, and advantages will be or become apparent to one with skill in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description.

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## BRIEF DESCRIPTION OF THE DRAWINGS

Many aspects of the disclosure can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the present 10 invention. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.

FIG. 1A is a block diagram showing one embodiment of a user agent uploading user information to a server.

FIGS. 1B and 1C are diagrams showing example user interfaces for providing a 15 login name and a password.

FIG. 2 is a block diagram showing one embodiment of a user agent instantiating a plurality of transport protocol objects (TPOs) at a client.

FIG. 3 is a block diagram showing one embodiment of a user agent communicating with a plurality of servers through the plurality of TPOs at the client.

20 FIG. 4A is a diagram showing an example user interface for providing contact information.

FIG. 4B is a diagram showing an example user interface showing contact information.

FIG. 5 is a block diagram showing another embodiment of a user agent 25 instantiating a plurality of transport protocol objects (TPOs) at a server.

FIG. 6 is a block diagram showing another embodiment of a user agent communicating with a plurality of servers through the plurality of TPOs at the server.

FIGS. 7 through 12 are data-flow diagrams outlining the relationship of various TPOs with a user agent and a server.

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## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference is now made in detail to the description of the embodiments as illustrated in the drawings. While several embodiments are described in connection with these drawings, there is no intent to limit the invention to the embodiment or 10 embodiments disclosed herein. On the contrary, the intent is to cover all alternatives, modifications, and equivalents. Additionally, while the interplay between several components are shown in process space for convenience, it will be clear to one of ordinary skill in the art that the components in the process space may correspond to objects that are created during processes at a client computer or a server computer, among 15 others.

FIG. 1A is a block diagram showing an example embodiment of a system having an instant messaging (IM) abstraction object 130. As shown in the non-limiting example of FIG. 1A, a BellSouth IM user agent 115 at a BellSouth client location 110 is in communication with a BellSouth server 120. The BellSouth server 120 may comprise an 20 IM server 126 and an abstraction server 124. The IM server 126 is adapted to handle normal IM functions, while the abstraction server 124 is adapted to handle translations of IM functions from various protocols into XML-structured information. The BellSouth IM user agent 115 may be a software application that assists a user in communicating with contacts via an IM session. In this regard, the BellSouth IM user agent 115 is 25 located at a BellSouth client location 110, which may be a personal computer, a handheld

computer, a cellular telephone having IM capabilities, an i-pager, or any network-compatible device.

When a BellSouth IM user (not shown) provides user information 150a at the BellSouth IM user agent 115 (*e.g.*, through one or more conventional input devices in response to one or more data entry screens displayed to the user), the user information 150a is transmitted by the BellSouth IM user agent 115 to the abstraction server 124 through a communication line 160 and other conventional mechanisms. In one example embodiment, among others, the user information is transmitted and stored on the abstraction server 124 as XML-structured information because XML provides a versatile approach that is compatible with almost any other Internet-based technology. In short, XML is a markup language for documents containing structured information, which contains both content (*e.g.*, words, pictures, etc.) and some indication of what role that content plays (*e.g.*, content in a section heading has a different meaning from content in a footnote, which means something different than content in a figure caption or content in a database table, etc.). The XML specification titled "Extensible Markup Language (XML) 1.0 (Second Edition), W3C Recommendation 6 October 2000" (referred to herein as "the XML specification") by W3C is hereby incorporated by reference as if set forth in its entirety.

If, for example, a BellSouth user has a BellSouth IM account, an America On-Line (AOL) IM account, a Yahoo IM account, a Microsoft Network (MSN) IM account, or any other IM account, then the BellSouth user may provide an IM login name and password for each of the user's accounts as part of the user information 150a. The inputting of the user information 150a is shown in FIGS. 1B and 1C. Thus, it should be clear that in at least one example embodiment, a mechanism may be provided for a user to create an account with other message services.

FIGS. 1B and 1C show two embodiments of user interfaces 102a, 102b for inputting login names and passwords at the BellSouth IM user agent 115. Prior to being presented the user interfaces 102a, 102b, a BellSouth IM user preferably enters a BellSouth login name (e.g., username) and password. FIG. 1B shows a user interface 5 102a for signing onto a BellSouth IM user's AOL account. As shown in FIG. 1B, the AOL user interface 102a provides an input box 104a adapted to receive the AOL login name (or screen name) of the BellSouth IM user. Similarly, the AOL user interface 102a provides an input box 106a adapted to receive the AOL password associated with the AOL login name. Upon entering the AOL login name and the AOL password, the AOL 10 user interface provides a status indication 108a to the BellSouth IM user. The status indication 108a indicates whether or not the BellSouth IM user is online at AOL. The status indication 108a will only indicate that the user is online if the user has selected the sign-on option at some point. Additionally, the AOL user interface provides sign-on 103a and sign-off 103b options to the BellSouth IM user so that the BellSouth IM user can 15 manually initiate and terminate a login to the AOL server.

FIG. 1C shows a user interface 102b for signing onto a BellSouth IM user's MSN account. Similar to the AOL user interface, the MSN user interface 102b provides an input box 104b adapted to receive the MSN login name of the BellSouth IM user. Also, the MSN user interface provides 102b an input box 106b adapted to receive the MSN 20 password associated with the MSN login name. Upon entering the MSN login name and the MSN password, the MSN user interface provides a status indication 108b to the BellSouth IM user. The status indication 108b indicates whether or not the BellSouth IM user is online at MSN. Additionally, the MSN user interface provides sign-on 103b and sign-off 105b options to the BellSouth IM user so that the BellSouth IM user can 25 manually initiate and terminate a login to the MSN server. Furthermore, since multiple

MSN IM accounts may exist at different domains, the MSN user interface provides examples 109 of sign-in names.

As shown in an example embodiment in FIG. 2, after a setup process, which itself may launch a login process, the BellSouth user inputs a user BellSouth login name and a

5 BellSouth password at a user interface (not shown) located at the BellSouth IM user agent 115. This information is conveyed to an IM abstraction object 130 located on the abstraction server 124. The IM abstraction object 130 accesses the user information 150b to retrieve login names and passwords for each of the IM accounts of the BellSouth IM user. In some embodiments, the BellSouth login username and password may be

10 different from a username and password for a native BellSouth IM session. Upon retrieving this information, the IM abstraction object 130 generates a request to the BellSouth IM user agent 115. The request includes information for instantiating a variety of TPOs. Thus, upon receiving the request, the BellSouth IM user agent 115 instantiates a BellSouth transport protocol object (TPO) 226, an AOL TPO 220, a Yahoo TPO 222,

15 and an MSN TPO 224 at the BellSouth client location 110. Thus, as shown in FIG. 2, by providing a single BellSouth IM user login and password, multiple TPOs are instantiated because the information needed to instantiate the various TPOs is already stored at the IM abstraction object 130. Other embodiments include transport mechanisms launched or activated in other manners.

20 Since the TPOs 220, 222, 224, 226 are instantiated at the client location 110, in accordance with one example embodiment, the translation from XML to the BellSouth protocol, the translation from XML to the AOL protocol, the translation from XML to the Yahoo protocol, and the translation from XML to the MSN protocol each occurs at the client location, thereby relinquishing resources of the abstraction server 124 for other

25 functions.

FIG. 3 is a block diagram showing one embodiment in which instantiated TPOs 220, 222, 224, 226 log on to their respective IM servers 310, 312, 314, 126 to provide interoperability between the various protocols. Upon being instantiated, each of the TPOs 220, 222, 224, 226 communicates with its respective server 310, 312, 314 to establish a session, and upon receiving tokens or other session identifiers from its respective server 310, 312, 314, 126, each TPO 220, 222, 224 generates a session identifier (ID). The session ID and the session information are conveyed back to the message router 170. It is worthwhile to note that the TPOs 220, 222, 224, 226 communicate with the various servers 310, 312, 314, 126 in the native protocol of the various servers. Thus, for example, the AOL TPO 220 communicates with the AOL server 310 using an AOL-native protocol; the Yahoo TPO 222 communicates with the Yahoo server 312 using the Yahoo-native protocol, etc. In this regard, each of the TPOs 220, 222, 224, 226 appears as a native client to each of the servers 310, 312, 314, 126. In other words, the MSN TPO 224 appears as an MSN client to the MSN server 314; the AOL TPO 220 appears as an AOL client to the AOL server 310, etc. Thus, none of the servers 310, 312, 314, 126 modify their respective IM protocols or IM interfaces because the servers 310, 312, 314, 126 are in communication with objects that behave as virtual native clients to those servers 310, 312, 314, 126.

The message router 170 stores the session information as shared session objects 190, 192, 194, 196 in the session collection 180. Thus, the AOL TPO 220 generates an AOL session ID, which is conveyed to the message router 170 for storage in the AOL session object 190. Similarly, the Yahoo TPO 222, the MSN TPO 224, and the BellSouth TPO 226 each generates a Yahoo session ID, an MSN session ID, and a BellSouth session ID, respectively. The session IDs are conveyed to the message router 170, which stores the Yahoo session ID in the Yahoo session object 192, the MSN session ID in the

MSN session object 194, and the BellSouth session ID in the BellSouth session object 196.

Typically, after the BellSouth user at the BellSouth IM user agent 115 has been logged onto the various servers 310, 312, 314, 126 and the logon information has been 5 stored as the respective session objects 190, 192, 194, 196 using its respective session IDs, an add-contact user interface is provided to the BellSouth IM user. An example add-contact user interface 202 is shown in FIG. 4A. As shown in FIG. 4A, the add-contact user interface 202 may comprise a drop-down menu 201 that includes descriptions for each of the BellSouth IM user's IM accounts. Thus, the BellSouth IM user may add 10 contacts from any account for which the BellSouth IM user also has an account. For example, if the BellSouth IM user wishes to add an AOL contact, then the BellSouth IM user would select the AOL IM service option on the drop-down menu 201. The add-contact user interface further comprises input boxes 203, 205, 206, 207 for the contact's IM logon name, the contact's first name, the contact's last name, and the contact's 15 nickname. Thus, upon selecting the AOL IM service option on the drop-down menu 201, the BellSouth IM user may enter one or more information fields related to the contact. Additionally, the add-contact user interface 202 comprises another drop-down menu 208 that permits the BellSouth IM user to select a group in which to categorize the contact. As a default, the AOL contact would be categorized in an AOL-contacts group.

20 Similarly, if the BellSouth IM user wishes to add an MSN contact, a BellSouth contact, or a Yahoo contact, then options similar to the AOL contact would be available for the MSN contact, the BellSouth contact, and the Yahoo contact. Once the contact information has been entered, the contact information is stored on its respective server. Thus, if an AOL contact is added, then the AOL contact information would be stored on 25 the BellSouth IM user's AOL account since the AOL TPO 220 is providing an interface to

the BellSouth IM user's AOL account. Similarly, if a Yahoo contact is added, then the Yahoo contact information would be stored on the Yahoo server at the user's Yahoo account. Likewise, addition of a BellSouth contact and an MSN contact would update the BellSouth IM user's accounts on the BellSouth server and the MSN server, respectively.

5 Once the contact information has been entered and stored on the respective servers, the contact information will be available to the BellSouth IM user for any subsequent IM session, including from the BellSouth IM user agent 115 at the BellSouth client location 110 and other locations. Additionally, the contact information, once it has been entered and stored, will also be available from other native clients at that native-client location  
10 and other locations.

In another embodiment, the BellSouth IM user would be able to access pre-existing contact information that is already stored on the various servers 310, 312, 314. Thus, rather than adding new contacts, when the various TPOs 220, 222, 224 establish a connection to their respective servers 310, 312, 314, the contact information from the  
15 servers 310, 312, 314 will be displayed to the BellSouth IM user at the user interface. One example of this is shown in FIG. 4B.

FIG. 4B shows an example contact list 302. As shown in FIG. 4B, the various contacts are automatically grouped together by their respective TPOs 303, 305, 307. Thus, all MSN contacts 305 are grouped together, all AOL 307 contacts are grouped  
20 together, etc. It will be clear, however, that the groupings may be changed by the BellSouth IM user according to the BellSouth IM user's preference. Also, for each of the contacts, an indication 304 appears beside the contact's name, which indicates the presence status of the contact. These indications 304, in a preferred embodiment are shown in different colors to easily differentiate differences in presence information (e.g.,  
25 not present, present, busy, etc.). Thus, for example, the indication 304 for available

contacts (*e.g.*, Larry, Amit, Sharon, etc.) may be shown in green (shown in FIG. 4B as hashed circles), the indication 304 for unavailable contacts (*e.g.*, BigHat, Johnnie, Gene, etc.) may be shown in grey (shown in FIG. 4B as clear circles), and the indication 304 for busy contacts (*e.g.*, Judy, Mitch, etc.) may be shown in red (shown in FIG. 4B as filled circles).

5 In addition to the available contacts, the contact list 302 includes user options 306, which permit the user to chat with a contact, add a new contact, or send a message or file to a contact, all of which would initiate another interface area (*e.g.*, window, screen, etc. (not shown)) for the user to accomplish those functions, as would be understood by one of 10 ordinary skill in the art. The user interface also provides the user with additional menus 308, such as an edit menu, an options menu, a sign-on menu, and a help screen. Since, as described above, the various TPOs 220, 222, 224, 226 provide a virtual native client to the various servers 310, 312, 314, 126, a single user interface may aggregate all of the contact information from all of the servers 310, 312, 314, 126 and display them to the 15 user on a single screen. The display of all contacts on all servers 310, 312, 314, 316 on a single screen permits the user to consolidate all of the contacts in a single user interface, thereby simplifying user IM interactions.

After a user logs onto IM sessions through the various TPOs 220, 222, 224, 226, presence information related to the contacts is further determined by the various TPOs 20 220, 222, 224, 226. This is shown with reference to FIG. 3. Thus, for example, if the BellSouth IM user has added CONTACT1 having an AOL IM address and a Yahoo IM address, and CONTACT 2 having only an MSN account, then presence information of CONTACT1 is determined from the AOL server 310 and the Yahoo server 312, and presence information of CONTACT2 is determined from the MSN server 314. While the 25 polling for presence is shown as being initiated by the TPOs 220, 222, 224, 226, the

evaluation of the various servers for presence information may also be initiated by the server or the client. Alternatively, the presence information may be continually refreshed to the various TPOs 220, 222, 224, 226 by the servers 310, 312, 314, 126 without the polling of the servers for the presence information.

5 In operation, the AOL TPO 220 may generate an AOL-native presence query to determine whether or not CONTACT1 is present. The AOL server 310 is polled using the AOL-native presence query. The AOL server 310 receives the query and generates AOL-native presence information, which indicates whether or not CONTACT1 is present. The AOL-native presence information is relayed to the AOL TPO 220. As with 10 other native information coming down to any TPO, the AOL TPO 220 encapsulates the AOL-native presence information to generate XML-structured presence information having an appropriate session ID. The XML-structured presence information is relayed to the message router 170 by the AOL TPO 220. The message router 170 receives the XML-structured presence information from the AOL TPO 220, and correlates the XML- 15 structured presence information to the established session using session object 190. Using the AOL session object 190 identified by the session ID from the AOL TPO 220, the message router 170 relays the XML-structured presence information to the BellSouth IM user agent 115.

The presence information of CONTACT1 from the Yahoo server 312 and the 20 presence information of CONTACT2 from the MSN server 314 are each determined in a similar fashion. Thus, as seen from FIG. 3, upon logging into each of the servers 310, 312, 314, 126, the respective TPOs 220, 222, 224, 226 determine the presence of the respective contacts. The presence information for each of the contacts is ultimately relayed back to the BellSouth user at the BellSouth IM user agent 115. In other words, 25 the BellSouth IM user now has presence information on each of the contacts on the

various servers 310, 312, 314, 126.

At this point, if CONTACT1 is present on AOL, and if the BellSouth user wishes to engage in an IM chat session with CONTACT1 through the AOL server 310, then the BellSouth user initiates an IM chat session with CONTACT1 from the BellSouth IM user agent 115. The BellSouth IM user agent 115 issues an XML-structured invitation to the message router 170. The message router 170 receives the XML-structured invitation and conveys the XML-structured invitation to the AOL TPO 220. The AOL TPO 220 receives the XML-structured invitation and generates a thread ID, which is used, in one form or another, to track the thread from the BellSouth IM user agent 115 and the AOL IM agent 320. In addition to generating the thread ID, the AOL TPO 220 translates the XML-structured invitation into an AOL-native invitation. The AOL TPO 220 issues the AOL-native invitation to the AOL server 310, which relays the AOL-native invitation to CONTACT1 at an AOL user agent 320 at an AOL client location. Since the AOL TPO 220 provides the AOL server 310 with AOL-native information related to the thread ID, each invitation may be properly delivered to CONTACT1 at the AOL user agent 320.

If CONTACT1 at the AOL user agent 320 accepts the invitation, then the AOL user agent 320 issues an AOL-native acceptance, which is relayed to the AOL server 310. The AOL server 310 further conveys the AOL-native acceptance to the AOL TPO 220. The AOL TPO 220 receives the AOL-native acceptance and encapsulates the AOL-native acceptance to produce an XML-structured acceptance. The XML-structured acceptance is relayed to the message router 170 by the AOL TPO 220. Since the XML-structured acceptance includes information related to the thread ID for that particular IM session, the message router 170 relays the XML-structured acceptance to the proper BellSouth IM user agent 115. Upon receiving the BellSouth-native acceptance, a chat session is established between the BellSouth IM user and CONTACT1.

During the chat session, the BellSouth user agent 115 generates an XML-structured message. The BellSouth TPO 226 conveys the XML-structured message to the message router 170, which subsequently routes the XML-structured message to the AOL TPO 220 based on the message ID. The AOL TPO 220 translates the XML-structured message into an AOL-native message, and conveys the AOL-native message to the AOL server 310. In addition to routing the XML-structured message, the message router 170 may further modify the message by, for example, adding additional XML tags or tracking information, encrypting all or sensitive portions of the message, etc. The AOL server 310 receives the AOL-native message from the TPO 220 and relays the AOL-native message to CONTACT1 at the AOL user agent 320.

Similarly, the AOL user agent 320 generates an AOL-native message. Of course the representative native user agents 320, 322, 324 could also be replaced in part by a plurality of IM user agents similar to the BellSouth IM user agent 115 having the various TPOs 220, 222, 224, 226. The AOL-native message has a message ID, or equivalent, to track the message. The AOL-native message is conveyed to the AOL IM server 310, which further conveys the AOL-native message to the AOL TPO 220. The AOL TPO 220 encapsulates the AOL-native message to produce an XML-structured message. In addition to producing the XML-structured message, the AOL TPO 220 may further modify the message by, for example, altering the header of the message. The AOL TPO 220 conveys the XML-structured message to the message router 170, which subsequently routes the XML-structured message to the BellSouth IM user at the BellSouth IM user agent 115.

Similar to the chat session with the AOL user agent 320, the BellSouth IM user agent 115 may engage in a chat session with the Yahoo user agent 322 and the MSN user agent 324 through the Yahoo TPO 222 and the MSN TPO 224, respectively. While this

process is not specifically described here, it will be clear to one of ordinary skill in the art that the Yahoo TPO 222, the MSN TPO 224, the BellSouth TPO 226, or any other TPO (not shown) performs similar functions to the AOL TPO 220. In other words, the various TPOs 222, 224, 226 each perform similarly as the AOL TPO 220 to translate between 5 various native protocols and XML.

As seen in the embodiments of FIGS. 2 and 3, the various TPOs 220, 222, 224 located at the BellSouth client location 110 provide for translation between various non-universal protocols and a single universal protocol, such as XML. Additionally, by having the TPOs 220, 222, 224, 226 located at a client rather than a server, resources of 10 the server are not consumed by translating the various protocols into XML. Thus, server bottlenecks associated with server processing are concomitantly reduced by having the TPOs 220, 222, 224 at the client location. Additionally, server firewall problems may be ameliorated by having the TPOs 220, 222, 224, 226 at the client location.

FIGS. 5 and 6 show another embodiment of a system, wherein the TPOs 221, 223, 15 225, 227 are located at the abstraction server 124. By having the TPOs 221, 223, 225 at the abstraction server 124, rather than at a client location, a single TPO may be used by multiple IM users, thereby reducing the number of instantiated TPOs.

As shown in an example embodiment in FIG. 5, the BellSouth user inputs a user BellSouth login name and a BellSouth password at a user interface (not shown) located at 20 the BellSouth IM user agent 115. This information is conveyed to an IM abstraction object 130 located on the abstraction server 124. A message router 175 in the IM abstraction object 130 instantiates a BellSouth TPO 227, an AOL TPO 221, a Yahoo TPO 223, and an MSN TPO 225 at the abstraction server 124. Similar to the embodiment of FIG. 2, by inputting a single user name and password, multiple TPOs (or sessions within 25 existing TPOs) are generated because the necessary information is stored at the

abstraction server.

Since the TPOs 221, 223, 225, 227 are instantiated at the abstraction server 124, a single TPO can accommodate multiple users from a particular protocol. For example, a single AOL TPO 221 can accommodate multiple AOL users; a single MSN TPO 225 can 5 accommodate multiple MSN users, etc. This reduces the number of TPOs instantiated, thereby reducing some of the processing by the server. Since multiple users can access the same TPO, the TPO generates a separate session ID for each of the multiple users.

The abstraction server 124 stores user information 150b, such as the various login names and passwords, as well as the various session objects 191, 193, 195, 197 associated 10 with a particular BellSouth IM user. Thus, when a BellSouth IM user subsequently logs on at a BellSouth IM user agent 115, the logon information is conveyed to the message router 175 at the abstraction server 124, which retrieves the user information 150b. Upon retrieving the user information 150b and the information related to the various TPOs 221, 223, 225, 227, the message router 175 automatically instantiates the BellSouth TPO 227, 15 the AOL TPO 221, the Yahoo TPO 223, and the MSN TPO 225, or utilizes respective existing TPOs.

FIG. 6 is a block diagram showing one embodiment in which instantiated TPOs 221, 223, 225, 227 logon to their respective IM servers 310, 312, 314, 126 to provide 20 interoperability between the various protocols. Once the BellSouth user at the BellSouth IM user agent 115 has been logged onto the various servers 310, 312, 314, 126 and the logon information has been stored as the respective session objects 191, 193, 195, 197 using its respective session IDs, an add-contact user interface is often accessed by the BellSouth IM user. Since an add-contact user interface has been described above, further discussion of the add-contact user interface is omitted here.

25 If the BellSouth IM user wishes to add an MSN contact, a BellSouth contact, or a

Yahoo contact, then options similar to the AOL contact would be available for the MSN contact, the BellSouth contact, and the Yahoo contact. Once the contact information has been entered, the contact information is stored on its respective server. Thus, if an AOL contact is added, then the AOL contact information would be stored on the BellSouth IM user's AOL account since the AOL TPO 221 is providing an interface to the BellSouth IM user's AOL account. Similarly, if a Yahoo contact is added, then the Yahoo contact information would be stored on the BellSouth IM user's Yahoo account since the Yahoo TPO 223 is providing an interface to the BellSouth IM user's Yahoo account. Likewise, addition of a BellSouth contact and an MSN contact would update the BellSouth IM user's account on the BellSouth server and the MSN server respectively. Once the contact information has been entered and stored on the respective servers, the contact information will be available to the BellSouth IM user for any subsequent IM session.

Upon logging onto subsequent IM sessions through the various TPOs 221, 223, 225, 227, presence information related to the contacts is further determined by the various TPOs 221, 223, 225, 227. For example, if the BellSouth IM user has added CONTACT1 having an AOL IM address and a Yahoo IM address, and CONTACT 2 having only an MSN account, then presence information of CONTACT1 is determined from the AOL server 310 and the Yahoo server 312, and presence information of CONTACT2 is determined from the MSN server 314. While the polling for presence is shown as being initiated by the TPOs 221, 223, 225, 227, the polling of the various servers for presence information may also be initiated by the server or the client. Alternatively, the presence information may be continually refreshed to the various TPOs 221, 223, 225, 227 by the servers 310, 312, 314, 126 without the polling of the servers for the presence information.

In operation, the AOL TPO 221 generates an AOL-native presence query to determine whether or not CONTACT1 is present. The AOL server 310 is polled using

the AOL-native presence query. The AOL server 310 receives the query and generates AOL-native presence information, which indicates whether or not CONTACT1 is present. The AOL-native presence information is relayed to the AOL TPO 221. The AOL TPO 221 encapsulates the AOL-native presence information to generate XML-structured presence information. The XML-structured presence information is relayed to the message router 175 by the AOL TPO 221. The message router 175 receives the XML-structured presence information from the AOL TPO 221, and correlates the XML-structured presence information to the AOL session object 191. Using the AOL session ID from the AOL session object 191, the message router 175 relays the XML-structured presence information to the BellSouth IM user agent 115.

Similarly, the Yahoo TPO 223 generates a Yahoo-native presence query to determine whether or not CONTACT1 is present. Likewise, the MSN TPO 225 generates an MSN-native presence query to determine whether or not CONTACT2 is present. Thus, as seen from FIG. 6, upon logging into each of the servers 310, 312, 314, 126, the respective TPOs 221, 223, 225, 227 determine the presence of the contacts. The presence information for each of the contacts is ultimately relayed back to the BellSouth user at the BellSouth IM user agent 115. In other words, the BellSouth IM user now has presence information on each of the contacts at the various servers 310, 312, 314, 126.

At this point, if CONTACT1 is present on AOL, and if the BellSouth user wishes to engage in an IM chat session with CONTACT1 through the AOL server 310, then the BellSouth user initiates an IM chat session with CONTACT1 from the BellSouth IM user agent 115. The BellSouth IM user agent 115 issues an XML-structured invitation to the message router 175. The message router 175 receives the XML-structured invitation and conveys the XML-structured invitation to the AOL TPO 221. The AOL TPO 221 receives the XML-structured invitation and translates the XML-structured invitation into

an AOL-native invitation. In addition to translating the XML-structured invitation, the AOL TPO 221 generates a thread ID, which is used, in one form or another, to track the thread between the BellSouth IM user agent 115 and the AOL user agent 320. The AOL TPO 221 issues the AOL-native invitation to the AOL server 310, which relays the AOL-native invitation to CONTACT1 at an AOL user agent 320 at an AOL client location. Since the AOL TPO 221 provides the AOL server 310 with information related to the thread ID, each invitation may be properly delivered to CONTACT1 at the AOL user agent 320.

If CONTACT1 at the AOL user agent 320 accepts the invitation, then the AOL user agent 320 issues an AOL-native acceptance, which is relayed to the AOL server 310. The AOL server 310 further conveys the AOL-native acceptance to the AOL TPO 221. The AOL TPO 221 receives the AOL-native acceptance and encapsulates the AOL-native acceptance to produce an XML-structured acceptance. The XML-structured acceptance is relayed to the message router 175 by the AOL TPO 221. Since the XML-structured acceptance includes information related to the thread ID for that particular IM session, the message router 175 relay the XML-structured acceptance to the proper BellSouth IM user agent 115. Upon receiving the BellSouth-native acceptance, a chat session is established between the BellSouth IM user and CONTACT1.

During the chat session, the BellSouth user agent 115 generates an XML-structured message. The BellSouth TPO 227 conveys the XML-structured message to the message router 175, which subsequently routes the XML-structured message to the AOL TPO 221 based on the message ID. The AOL TPO 221 translates the XML-structured message into an AOL-native message. In addition to routing the XML-structured message, the message router 175 may further modify the message by, for example, adding additional XML tags or tracking information, encrypting all or sensitive portions of the

message, etc. Upon translating the message, the AOL TPO 221 conveys the AOL-native message to the AOL server 310. The AOL server 310 receives the AOL-native message and relays the AOL-native message to CONTACT1 at the AOL user agent 320.

Similarly, the AOL user agent 320 generates an AOL-native message. The AOL-native message is conveyed to the AOL IM server 310, which further conveys the AOL-native message to the AOL TPO 221. The AOL TPO 221 encapsulates the AOL-native message to produce an XML-structured message. In producing the XML-structured message, the AOL TPO 221 may further modify the message by, for example, modifying the message header. The AOL TPO 221 conveys the XML-structured message to the message router 175, which subsequently routes the XML-structured message to the BellSouth IM user at the BellSouth IM user agent 115.

Similar to the chat session with CONTACT1 at the AOL user agent 320, a chat session may be established with CONTACT1 at the Yahoo user agent 322 using the Yahoo TPO 223. Likewise a chat session may be established with CONTACT2 at the MSN user agent 324 using the MSN TPO 225. Since the chat sessions are established through the various TPOs 221, 223, 225, 227, each of the native servers 310, 312, 314, 126 communicate using their respective native protocols. Thus, for example, the AOL server 310 uses an AOL-native protocol; the Yahoo server 312 uses the Yahoo-native protocol, etc. In this regard, each of the TPOs 221, 223, 225, 227 appears as a native client to each of their respective servers 310, 312, 314, 126. In other words, the MSN TPO 225 appears as an MSN client to the MSN server 314; the AOL TPO 221 appears as an AOL client to the AOL server 310, etc. Thus, none of the servers 310, 312, 314, 126 modify their respective IM protocols or IM interfaces because the servers 310, 312, 314, 126 are in communication objects that behave as virtual native clients to those servers 25 310, 312, 314, 126.

FIGS. 7 through 12 are data flow diagrams illustrating the data flow through the system of FIGS. 1A through 4B. In the example embodiment of FIGS. 7 through 12, the BellSouth IM user has accounts on only AOL and BellSouth. However, extension of the data flow charts to other IM servers will be clear to one of ordinary skill in the art.

5 As shown in FIG. 7, a preferred embodiment of a set up process includes the BellSouth IM user agent 115 providing (502) user information to the IM abstraction object 130. In a preferred embodiment, the user information may include a user login name and password for various IM accounts. Additionally, the user information may include a list of contacts and the contacts' IM addresses. In other embodiments, contact  
10 information is not communicated during the setup process.

Continuing in FIG. 8, subsequent to providing (502) the setup user information to the IM abstraction object 130, the BellSouth IM user agent 115 can log in (504) to the IM abstraction object 130 by providing a user name and a password to the IM abstraction object. In response to logging in (504), the IM abstraction object 130 verifies the user  
15 name and password and looks up (506) additional login information related to the user. The IM abstraction object 130 uses the additional login information to request (508) instantiation of various TPOs by the BellSouth IM user agent 115. Since, in the example embodiment of FIGS. 7 through 12, the BellSouth IM user (not shown) has IM accounts on BellSouth and AOL, the IM abstraction object 130 requests (508) instantiation of the  
20 BellSouth TPO 226 and the AOL TPO 220. In response to the request (508), the BellSouth IM user agent 115 instantiates a BellSouth TPO 226 at the BellSouth client location 110. The BellSouth TPO 226 communicates (512) with the BellSouth IM server 126 in order to establish a session with the BellSouth IM server 126. The BellSouth IM server 126 conveys (514) tokens or other identifiers back to the BellSouth TPO 226, and  
25 the BellSouth TPO 226 generates (516) a session ID in response to the tokens or other

identifiers. Session information including the session ID is then stored (518) as a BellSouth session object 196 at the IM abstraction object 130. In some embodiments, the BellSouth IM server 126 is co-located with the IM abstraction object 130, while in other embodiments, the BellSouth IM server 126 is located separately from the IM abstraction 5 object 130.

Similarly, as shown in FIG. 9, when the user logs on (504), which is the same action as the log on (504) shown in FIG. 8, re-shown here for clarity, the IM abstraction object 130 looks up (506) (again, re-shown for clarity) login information and requests (520) instantiation of an AOL TPO 220. The request (520) is conveyed to the BellSouth 10 IM user agent 115, which instantiates (522) the AOL TPO 220 at the BellSouth client location 110. Upon instantiating (522) the AOL TPO 220, the AOL TPO 220 communicates (524) with the AOL IM server 310, which conveys (526) tokens or other identifiers back to the AOL TPO 220. The AOL TPO 220 generates (528) a session ID using the tokens or other identifiers, and stores (530) session information along with the 15 session ID as an AOL session object 190 at the IM abstraction object 130.

As shown in FIG. 10, once the BellSouth TPO 226 and the AOL TPO 220 have been instantiated according to FIGS. 8 and 9, the AOL TPO 220 generates (532) an AOL-native login request, which is also a presence query to determine presence information of AOL contacts of the BellSouth IM user. The AOL-native login request is thus used to 20 poll (534) the AOL server 310 for presence information. The AOL server 310 logs the user in and determines (536) presence information of the BellSouth IM user's AOL contacts, and relays (538) a login acknowledgement and the AOL-native presence information to the AOL TPO 220, often in multiple steps in some embodiments. In another embodiment, the AOL TPO 220 may not generate (532) a query. Rather, the 25 AOL server 310 may continually update presence information and relay (538) the

presence information to the AOL TPO 220 without a query for presence information. In either event, upon receiving the AOL-native login acknowledgement and presence information from the AOL server 310, the AOL TPO 220 encapsulates (540) the presence information using XML to produce XML-structured presence information for the IM abstraction object 130. The AOL TPO 220 also generates a socket ID that identifies a port through which the AOL IM session is established, which is correlated with a session ID for that connection. The XML-structured information is relayed (542) to the IM abstraction object, which uses the accompanying session ID in the XML-structured presence information. Upon determining (544) the proper session, the XML-structured presence information is relayed (546) from the IM abstraction object to the BellSouth IM user agent 115. At some point, the BellSouth IM user has presence information related to all of the BellSouth IM user's AOL contacts.

Subsequently, as shown in FIG. 11, if the BellSouth IM user chooses to engage in a chat session with one of the AOL contacts, then the user inputs a session initiation at the BellSouth IM user agent 115. This BellSouth IM user agent 115 receives (548) the user input and issues (550) an XML-structured invitation for a chat session to the IM abstraction object 130. The IM abstraction object 130 relays (552) the XML-structured invitation to the AOL TPO 220. The AOL TPO 220 receives the XML-structured invitation and translates (554) the XML-structured invitation into an AOL-native invitation. In translating (554) the XML-structured invitation, the AOL TPO 220 may appropriately modify headers and other aspects of the invitation to be consonant with AOL-native protocol. The AOL-native invitation is relayed (556) by the AOL TPO 220 to the AOL server 310, which subsequently relays (557) the AOL-native invitation to the AOL user agent 320. If the invitation is accepted by the BellSouth IM user's AOL contact, then the AOL user agent 320 issues (558) an AOL-native acceptance to the AOL

server 310. The AOL-native acceptance is relayed (560) from the AOL server 310 to the AOL TPO 220.

As shown in FIG. 12, upon receiving the AOL-native acceptance, the AOL TPO 220 encapsulates (562) the AOL-native acceptance using XML to produce an XML-structured acceptance. The XML-structured acceptance is relayed (563) from the AOL TPO 220 to the IM abstraction object 130, which determines (564) the chat session from information in the XML-structured acceptance. The XML-structured acceptance is then properly relayed (566) to the BellSouth IM user agent 115, at which time an IM chat session is established (568).

Once the IM chat session has been established, the BellSouth IM user agent 115 generates XML-structured chat messages, which are translated into AOL-native chat messages at the AOL TPO 220. The AOL-native chat messages are conveyed from the AOL TPO 220 to the AOL server 310, and subsequently to the AOL user agent 320 as an AOL-native chat message.

Similarly, while not specifically shown in FIGS. 7 through 12, in an alternative embodiment, the TPOs may be instantiated at the abstraction server 124 rather than at the client location 110. Thus, in the alternative embodiment, rather than requesting the BellSouth IM user agent 115 to instantiate the TPOs, the IM abstraction object 130 instantiates the TPOs at the abstraction server 124. Once the TPOs have been instantiated at the abstraction server 124, the TPOs at the abstraction server 124 provide part of the interface between the BellSouth IM user agent 115 and the various servers 310, 312, 314, 126.

The IM user agents 115, 320, 322, 324, 326, the session objects 190, 191, 192, 193, 194, 195, 196, 197, the message router 170, 175, and the TPOs 220, 221, 222, 223, 224, 225, 226, 227 of the present invention can be implemented in hardware, software,

firmware, or a combination thereof. In the preferred embodiments, the The IM user agents 115, 320, 322, 324, 326, the session objects 190, 191, 192, 193, 194, 195, 196, 197, the message router 170, 175, and the TPOs 220, 221, 222, 223, 224, 225, 226, 227 are implemented in software or firmware that is stored in a memory and that is executed 5 by a suitable instruction execution system. If implemented in hardware, as in an alternative embodiment, The IM user agents 115, 320, 322, 324, 326, the session objects 190, 191, 192, 193, 194, 195, 196, 197, the message router 170, 175, and the TPOs 220, 221, 222, 223, 224, 225, 226, 227 can be implemented with any or a combination of the following technologies, which are all well known in the art: Internet Appliances, a 10 discrete logic circuit(s) having logic gates for implementing logic functions upon data signals, an application specific integrated circuit (ASIC) having appropriate combinational logic gates, a programmable gate array(s) (PGA), a field programmable gate array (FPGA), etc.

Any process descriptions or blocks in the data-flow diagrams should be 15 understood as representing modules, segments, or portions of code which include one or more executable instructions for implementing specific logical functions or steps in the process, and alternate implementations are included within the scope of the preferred embodiment of the present invention in which functions may be executed out of order from that shown or discussed, including substantially concurrently or in reverse order, 20 depending on the functionality involved, as would be understood by those reasonably skilled in the art of the present invention.

The IM user agents 115, 320, 322, 324, 326, the session objects 190, 191, 192, 193, 194, 195, 196, 197, the message router 170, 175, and the TPOs 220, 221, 222, 223, 224, 225, 226, 227 may also be implemented as a computer program, which comprises an 25 ordered listing of executable instructions for implementing logical functions. As such the

computer program can be embodied in any computer-readable medium for use by or in connection with an instruction execution system, apparatus, or device, such as a computer-based system, processor-containing system, or other system that can fetch the instructions from the instruction execution system, apparatus, or device and execute the

5 instructions. In the context of this document, a "computer-readable medium" can be any means that can contain, store, communicate, propagate, or transport the program for use by or in connection with the instruction execution system, apparatus, or device. The computer-readable medium can be, for example but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, device,

10 or propagation medium. More specific examples (a nonexhaustive list) of the computer-readable medium would include the following: an electrical connection (electronic) having one or more wires, a portable computer diskette (magnetic), a random access memory (RAM) (electronic), a read-only memory (ROM) (electronic), an erasable programmable read-only memory (EPROM or Flash memory) (electronic), an optical fiber (optical), and a portable compact disc read-only memory (CDROM) (optical). Note that the computer-readable medium could even be paper or another suitable medium upon which the program is printed, as the program can be electronically captured, via for instance optical scanning of the paper or other medium, then compiled, interpreted or otherwise processed in a suitable manner if necessary, and then stored in a computer

15 memory.

20

Although exemplary embodiments have been shown and described, it will be clear to those of ordinary skill in the art that a number of changes, modifications, or alterations may be made, none of which depart from the spirit of the present invention. For example, while an AOL server 310, a Yahoo server 312, an MSN server 314, and a BellSouth IM

25 server 126 have been shown in the example embodiments, it will be clear to one of

ordinary skill in the art that the systems and methods as outlined above may be extended to other Internet-based IM protocols. Also, while XML-structured information is chosen as a preferred embodiment, it will be clear to one of ordinary skill in the art that other languages or protocols may be used in place of XML, so long as those protocols provide

5 for broad Internet applications. Additionally, while the IM abstraction object 130 is located on the abstraction server 124 in the various embodiments, it will be clear to one of ordinary skill in the art that the IM abstraction object 130 may be located at a client location, rather than at a server. Also, while IM has specifically been described in detail in FIGS. 1A through 12, it will be clear to one of ordinary skill in the art that the IM

10 implementation may easily be extended to other messaging techniques such as email, voice-over Internet protocol (VoIP), video-conferencing, etc. Thus, the IM abstraction object 130 and the TPOs 220, 221, 222, 223, 224, 225, 226, 227 may be implemented outside of the IM context. In other words, the architecture of the IM abstraction object 130 and the TPOs 220, 221, 222, 223, 224, 225, 226, 227 is independent of the type of

15 messaging technology, and may be adapted to translate native protocols for various messaging technologies into a universal language, thereby providing a user with similar options as those discussed herein. Also, while the BellSouth client location 110 is shown with only a BellSouth IM user agent 115, it will be clear to one of ordinary skill in the art that the BellSouth client location 110 may include other conventional components.

20 Additionally, while the BellSouth IM user agent 115 is described above as pre-existing at the BellSouth client location 110, it will be clear to one of ordinary skill in the art that the BellSouth IM user agent 115 may be downloaded from a website and installed at the BellSouth client location 110 or, alternatively, installed at the BellSouth client location 110 using other conventional techniques. Also, while specific servers are shown in the

25 various embodiments, it will be clear to one of ordinary art that these specific servers are

foreign servers in that the servers do not use XML as their native protocol. All such changes, modifications, and alterations should therefore be seen as within the scope of the present invention.

**What is claimed is:**

1        1. A communication system comprising:  
2            a server; and  
3            a plurality of transport protocol objects (TPOs) instantiated at the server, each of  
4            the plurality of TPOs adapted to provide a translation between a first instant messaging  
5            (IM) protocol and a different IM protocol.

1        2. The system of claim 1, further comprising:  
2            a message router coupled to the TPOs, the message router being adapted to  
3            transmit IM messages to an IM user agent using the first IM protocol, the message router  
4            further being adapted to receive IM messages from the IM user agent using the first IM  
5            protocol.

1        3. The system of claim 2, further comprising:  
2            a session collection having a plurality of session objects, each of the plurality of  
3            session objects having information associated with each of the plurality of TPOs.

1           4.     In a communication system, a method comprising:

2           instantiating a transport protocol object (TPO) at a server, the TPO adapted to

3     provide a translation between a first instant messaging (IM) protocol and a second IM

4     protocol;

5           establishing a connection between the TPO and a foreign server, the foreign server

6     adapted to transmit and receive IM messages using the second IM protocol; and

7           providing a communication pathway between a plurality of IM user agents and the

8     foreign server through the instantiated TPO, the plurality of IM user agents adapted to

9     transmit and receive IM messages using the first IM protocol.

1           5.     In a communication system, a method comprising:

2           instantiating a plurality of transport protocol objects (TPOs) at a server, each of

3     the plurality of TPOs adapted to provide a translation between a first instant messaging

4     (IM) protocol and a different IM protocol;

5           establishing a plurality of connections between the plurality of TPOs and a

6     plurality of IM servers, each of the plurality of IM servers adapted to transmit and receive

7     IM messages using one of the different IM protocols; and

8           providing a communication pathway between a plurality of IM user agents and the

9     plurality of IM servers through the plurality of instantiated TPOs, the plurality of IM user

10    agents adapted to transmit and receive IM messages using the first IM protocol.

1           6.       The method of claim 5, wherein the instantiating the plurality of TPOs  
2       comprises:

3           receiving a single login name and password;

4           correlating the single login name and password to a plurality of login names and

5       passwords, each of the plurality of login names and passwords associated with one of a

6       plurality of IM accounts, each of the plurality of IM accounts on one of a plurality of IM

7       servers, each of the plurality of IM servers adapted to transmit and receive IM messages

8       using a different IM protocol;

9           retrieving information related to each of the different IM protocols; and

10          conveying the retrieved information and the plurality of login names and

11       passwords to one of the plurality of IM user agents.

1           7.       The method of claim 6, wherein the instantiating the plurality of TPOs

2       further comprises:

3           receiving the information related to each of the different IM protocols; and

4           instantiating a plurality of TPOs, each of the plurality of TPOs associated with

5       each of the different IM protocols.

1           8.       The method of claim 5, wherein the establishing the plurality of  
2       connections between the plurality of TPOs and the plurality of IM servers comprises:  
3               receiving a plurality of login names and passwords, each of the plurality of login  
4       names and passwords associated with one of a plurality of IM accounts, each of the  
5       plurality of IM accounts located on one of the plurality of IM servers, each of the  
6       plurality of IM servers adapted to transmit and receive IM messages using a different IM  
7       protocol; and  
8               establishing an IM session at each of the plurality of IM accounts using the  
9       received plurality of login names and passwords.

1           9.       The method of claim 8, wherein the establishing the IM session comprises:  
2               receiving information from each of the plurality of IM servers; and  
3               generating a session ID associated with each of the plurality of IM servers in  
4       response to receiving information.

1           10.      The method of claim 9, further comprising:  
2               storing session information having the generated session ID.

1           11.    The method of claim 5, wherein the providing the communication pathway

2   comprises:

3           receiving a message from one of the plurality of IM user agents, the message

4   received using the first IM protocol;

5           translating the message from the first IM protocol to one of the different IM

6   protocols; and

7           conveying the translated message to one of the plurality of IM servers, the one of

8   the plurality of IM servers adapted to transmit and receive IM messages using the one of

9   the different IM protocols.

1           12.    The method of claim 11, wherein the translating the message from the first

2   IM protocol to one of the different IM protocols comprises:

3           translating an Extensible Markup Language (XML) structured message into a non-

4   XML-structured message.

1           13.    The method of claim 12, wherein the translating the XML-structured

2   message into the non-XML-structured message comprises:

3           translating XML-structured presence information into non-XML-structured

4   presence information.

1           14.    The method of claim 12, wherein the translating the XML-structured

2   message into the non-XML-structured message comprises:

3           translating an XML-structured text message into non-XML-structured text

4   message.

1           15.    The method of claim 5, wherein the providing the communication pathway  
2   comprises:

3           receiving a message from the one of the plurality of IM servers, the one of the  
4   plurality of IM servers adapted to transmit and receive IM messages using one of a  
5   plurality of different IM protocols;

6           translating the message from one of the plurality of different IM protocols to a  
7   first IM protocol; and

8           conveying the translated message to one of the plurality of IM user agents.

1           16.    The method of claim 15, wherein the translating the message from one of  
2   the plurality of different IM protocols the first IM protocol comprises:

3           translating a non-Extensible Markup Language (XML) structured message into an  
4   XML-structured message.

1           17.    The method of claim 16, wherein the translating the non-XML-structured  
2   message into the XML-structured message comprises:

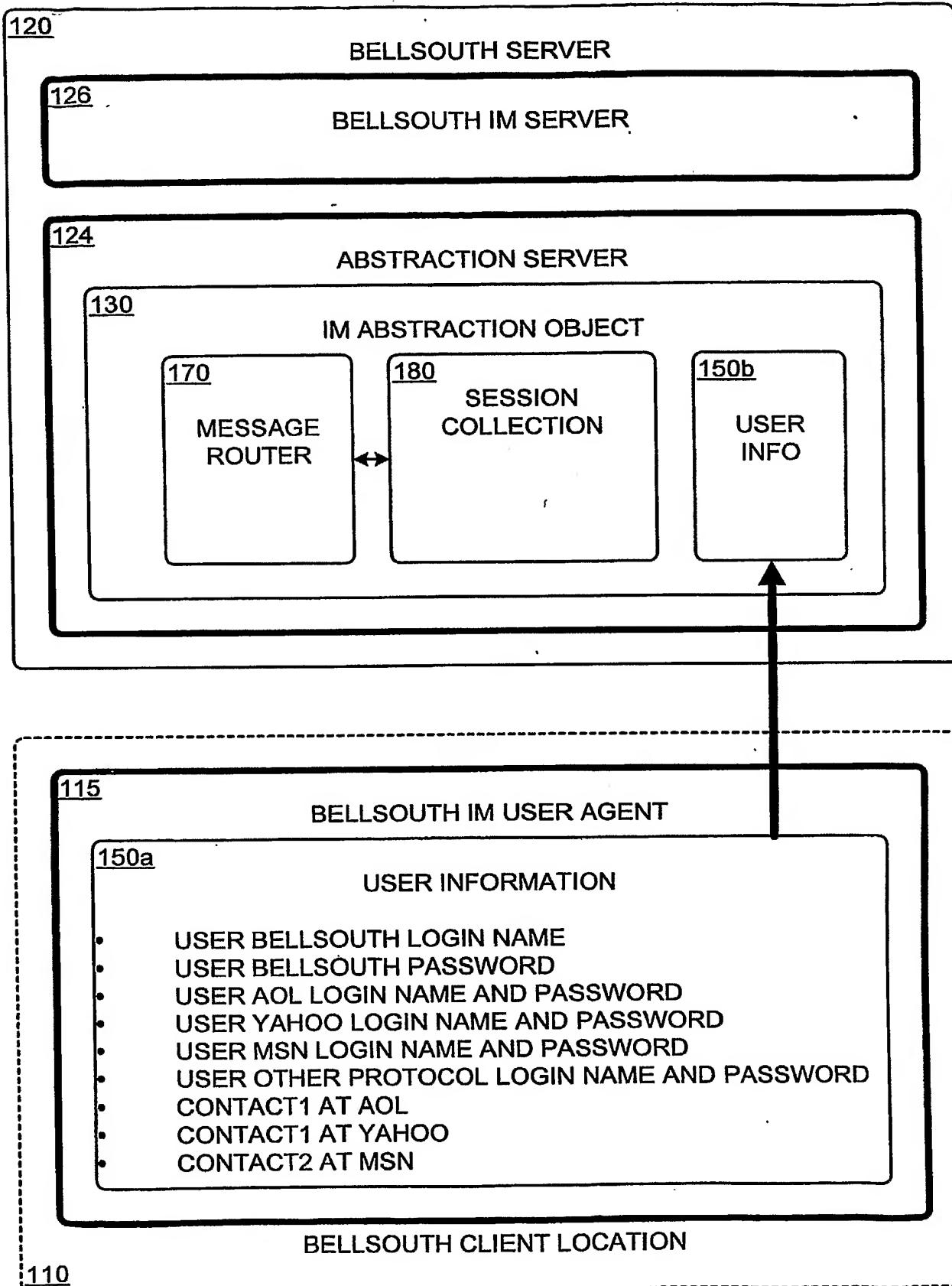
3           translating non-XML-structured presence information into XML-structured  
4   presence information.

1           18.    The method of claim 16, wherein the translating the non-XML-structured  
2   message into the XML-structured message comprises:

3           translating a non-XML-structured text message into an XML-structured text  
4   message.

- 1        19.      A communication system comprising:
- 2                means for instantiating a plurality of transport protocol objects (TPOs) at a server,
- 3                each of the plurality of TPOs adapted to provide a translation between a first instant
- 4                messaging (IM) protocol and a different IM protocol;
- 5                means for establishing a plurality of connections between the plurality of TPOs
- 6                and a plurality of IM servers, each of the plurality of IM servers adapted to transmit and
- 7                receive IM messages using one of the different IM protocols; and
- 8                means for providing a communication pathway between a plurality of IM user
- 9                agents and the plurality of IM servers through the plurality of instantiated TPOs, each of
- 10               the plurality of IM user agents adapted to transmit and receive IM messages using the
- 11               first IM protocol.

1           20.     A computer-readable medium comprising:  
2            computer-readable code adapted to instruct a programmable device to instantiate a  
3            plurality of transport protocol objects (TPOs) at a server, each of the plurality of TPOs  
4            adapted to provide a translation between a first instant messaging (IM) protocol and a  
5            different IM protocol;  
6            computer-readable code adapted to instruct a programmable device to establish a  
7            plurality of connections between the plurality of TPOs and a plurality of IM servers, each  
8            of the plurality of IM servers adapted to transmit and receive IM messages using one of  
9            the different IM protocols; and  
10           computer-readable code adapted to instruct a programmable device to provide a  
11           communication pathway between a plurality of IM user agents and the plurality of IM  
12           servers through the plurality of instantiated TPOs, the plurality of IM user agents adapted  
13           to transmit and receive IM messages using the first IM protocol.



**FIG. 1A**  
SUBSTITUTE SHEET (RULE 26)

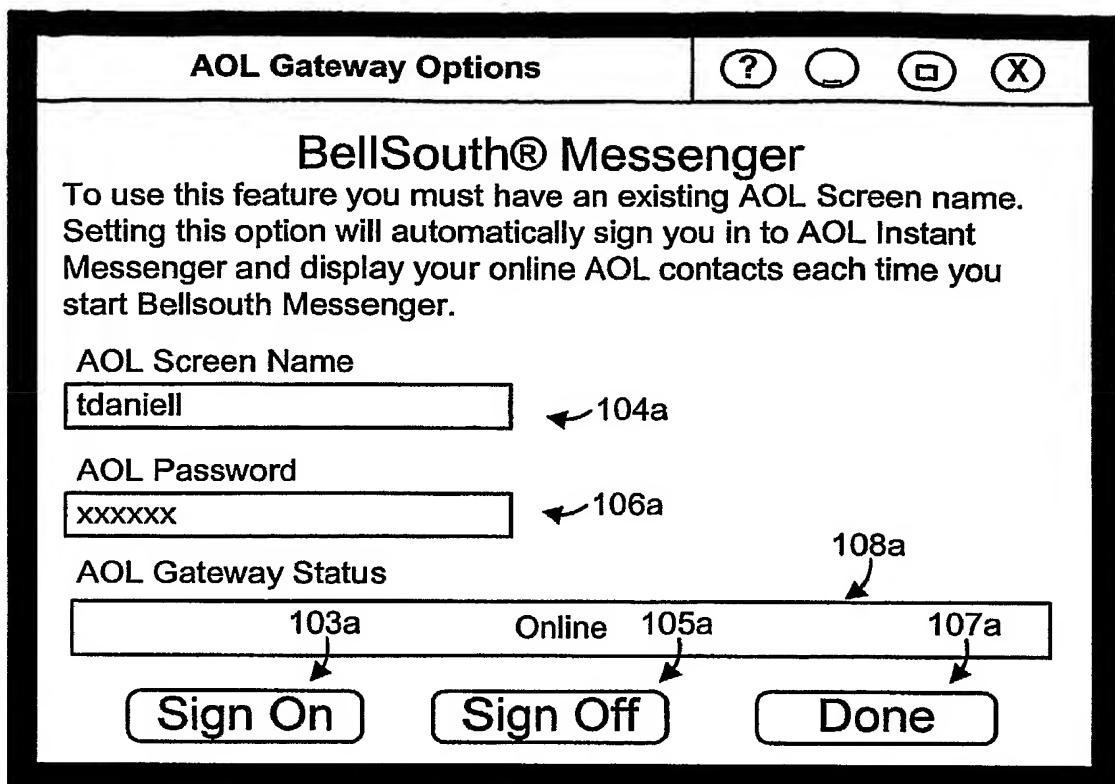
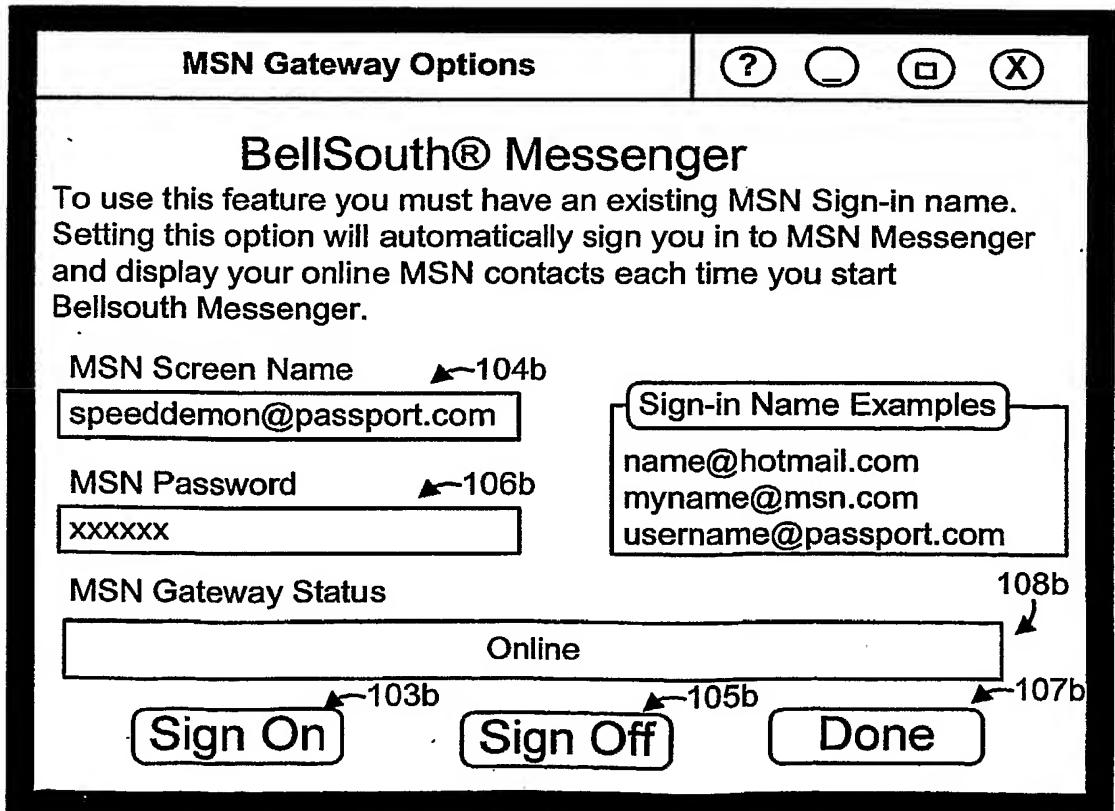


FIG. 1B



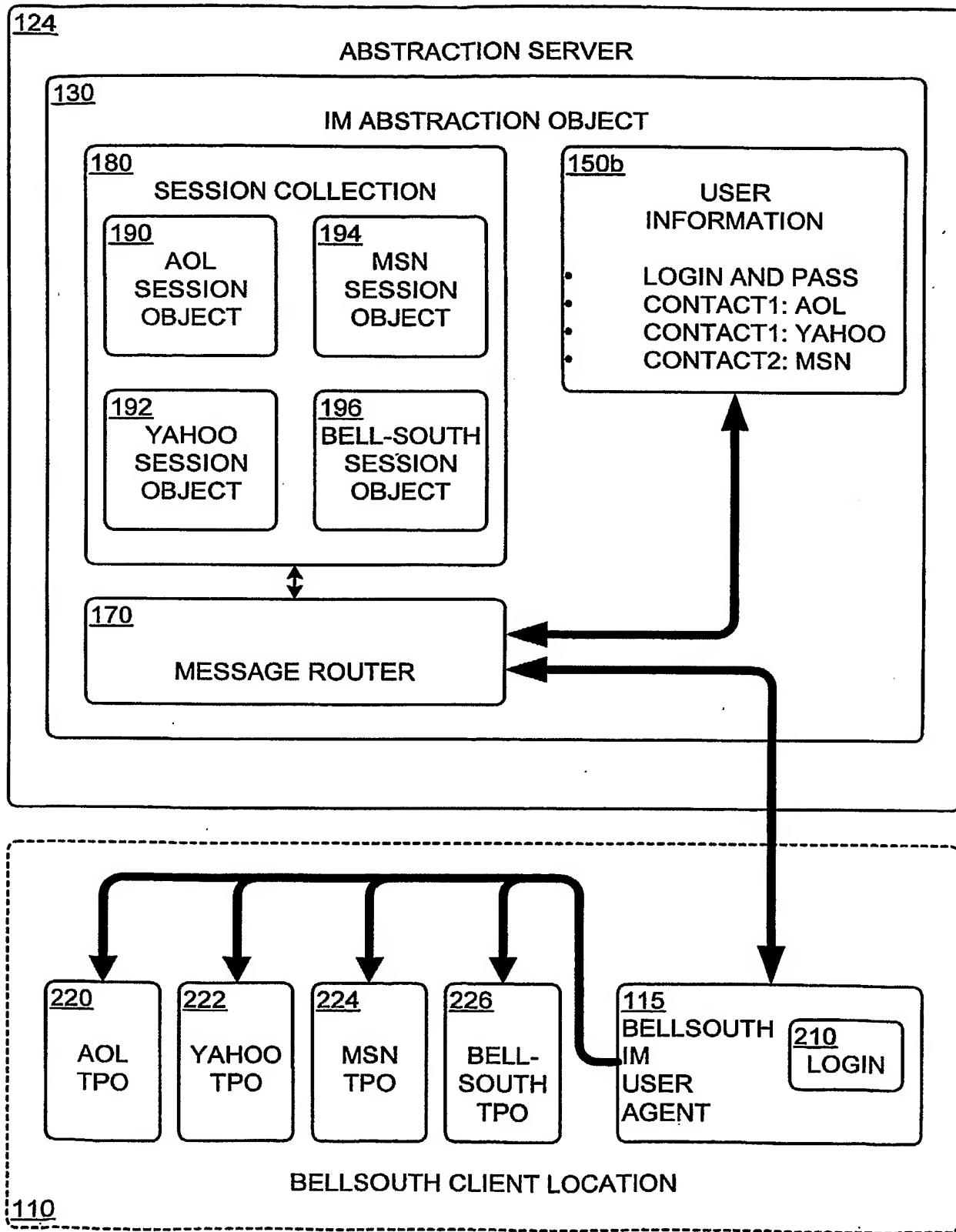


FIG. 2

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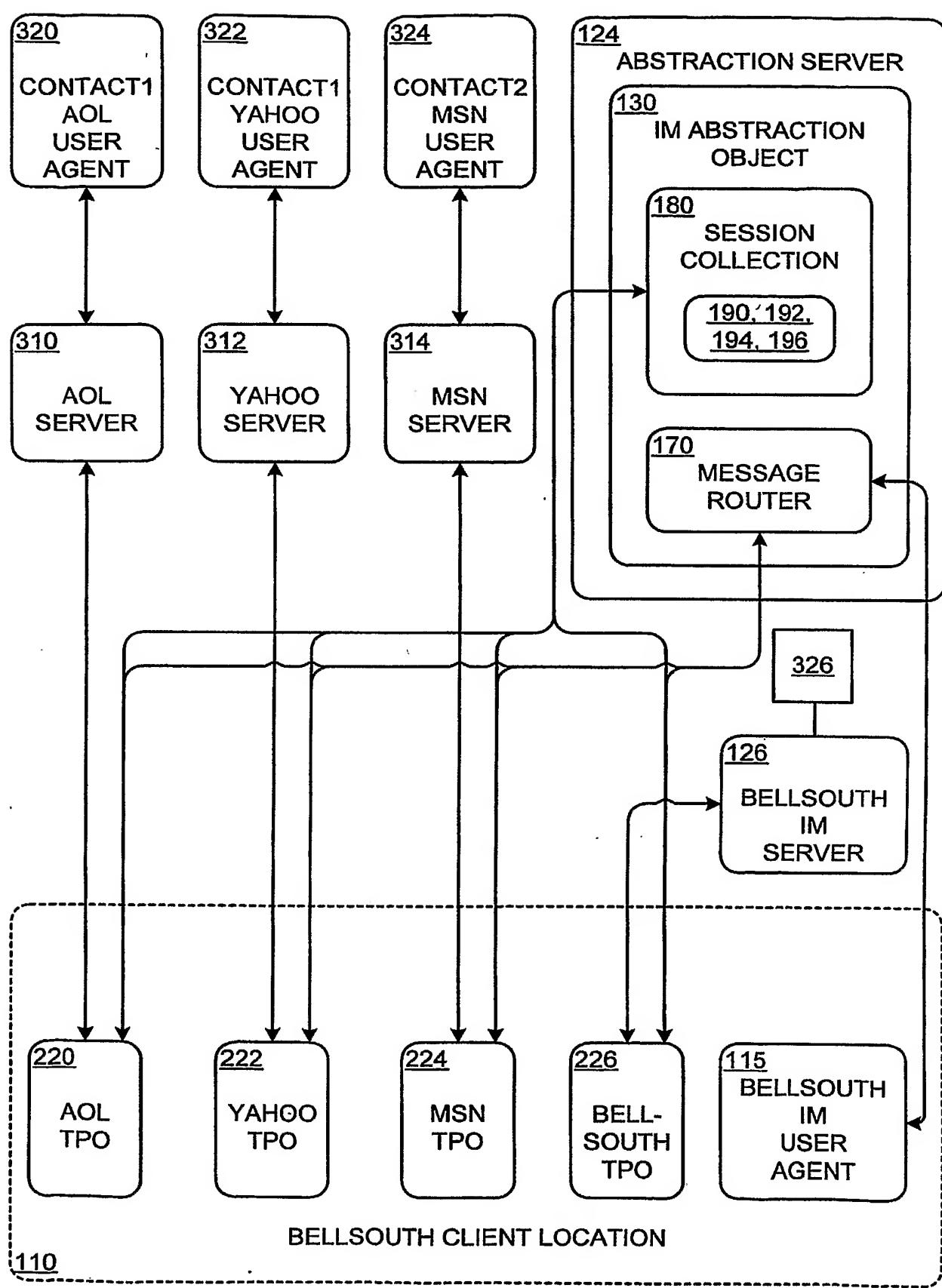


FIG. 3

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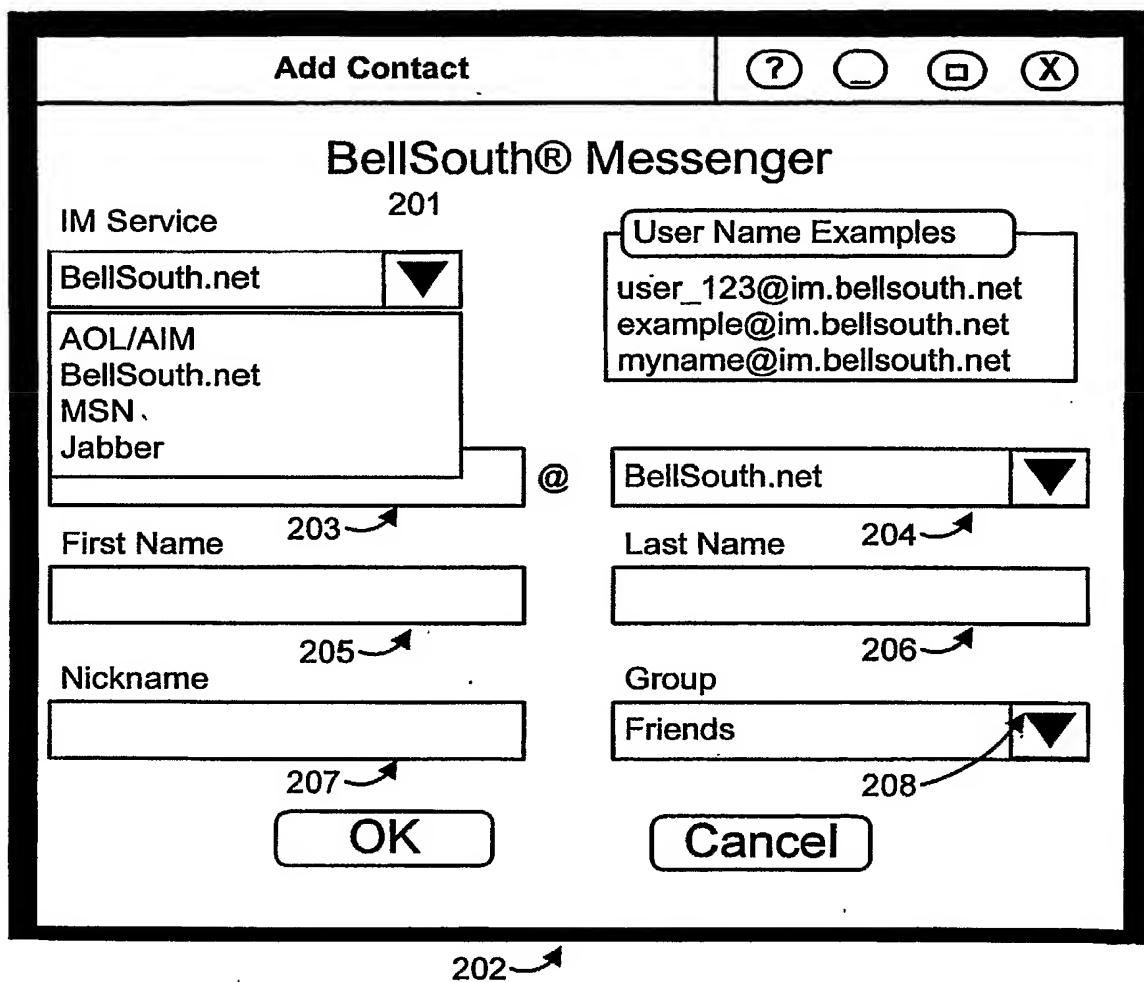
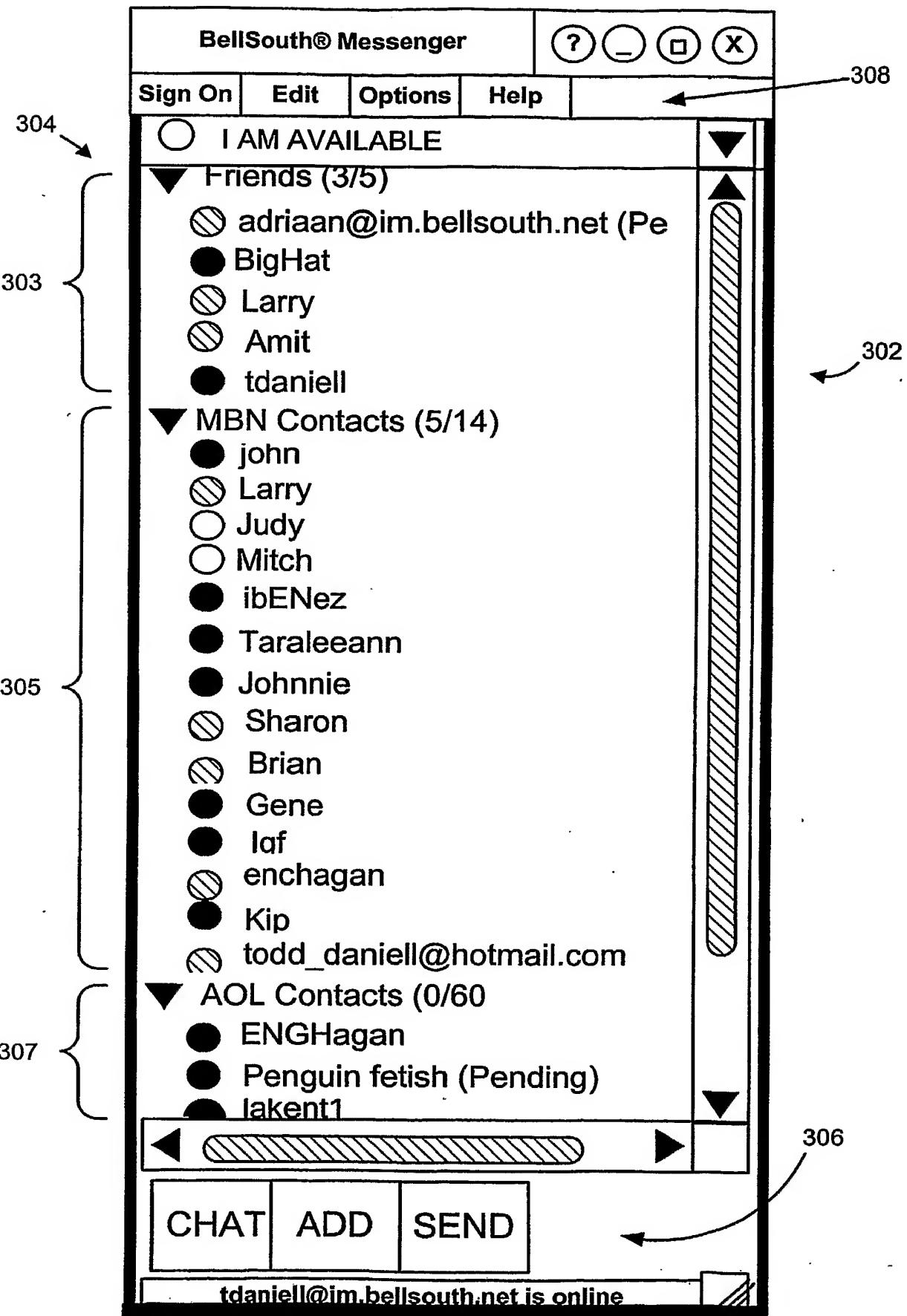


FIG. 4A



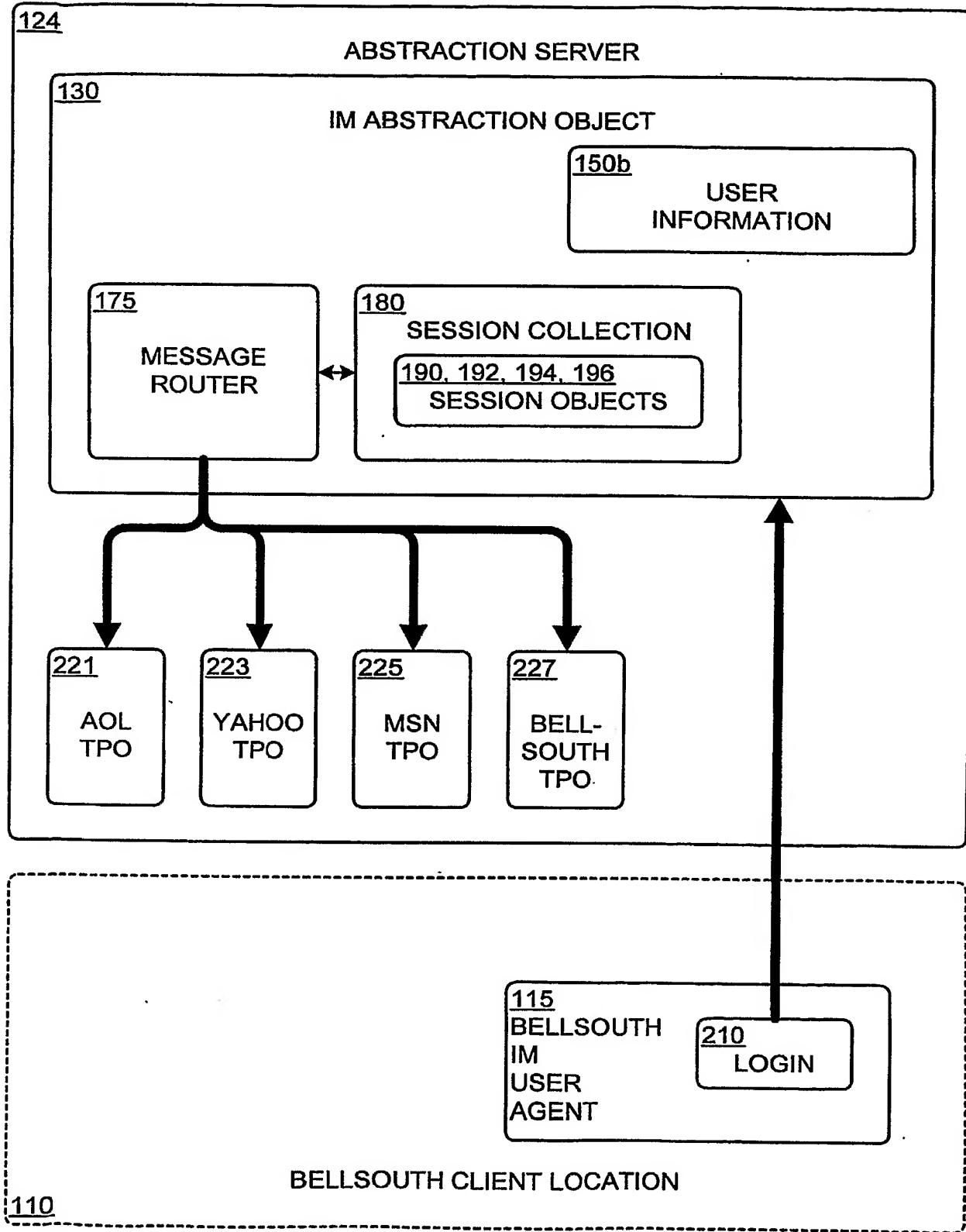


FIG. 5  
SUBSTITUTE SHEET (RULE 26)

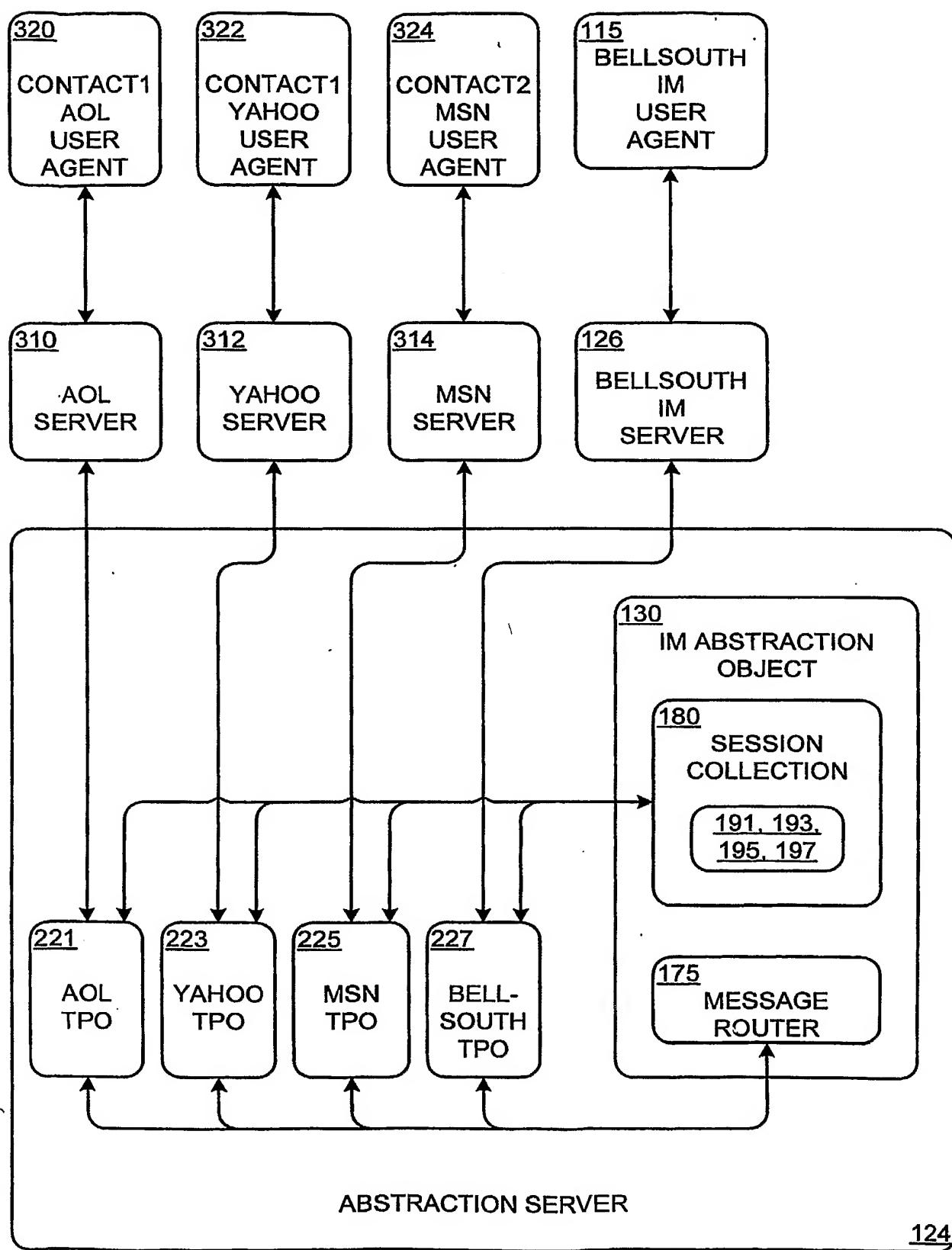


FIG. 6

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**FIG. 7**

**BELLSOUTH  
IM USER  
AGENT**

115

**BELLSOUTH  
IM  
SERVER**

126

USER  
INFORMATION  
502

**BELLSOUTH  
TPO**

226

**IM  
ABSTRACTION  
OBJECT**

130

**AOL  
TPO**

220

**AOL  
SERVER**

310

**AOL  
USER  
AGENT**

320

**SUBSTITUTE SHEET (RULE 26)**

## FIG. 8

BELLSOUTH  
IM USER  
AGENT

115

BELLSOUTH  
IM  
SERVER

126

510  
INSTANTIATE  
BELLSOUTH  
TPO

BELLSOUTH  
TPO

226

USER  
LOGIN  
504  
COMMUNICATE  
WITH  
BELLSOUTH IM  
SERVER  
512

CONVEY  
SESSION  
TOKEN  
514

IM  
ABSTRACTION  
OBJECT

130

508  
REQUEST  
BELLSOUTH  
TPO  
INSTANTIATION

516  
GENERATE  
SESSION ID

STORE  
INFORMATION  
AS SESSION  
OBJECT 518

AOL  
TPO.

220

LOOKUP  
LOGIN  
INFORMATION  
506

AOL  
SERVER

310

AOL  
USER  
AGENT

320

SUBSTITUTE SHEET (RULE 26)

FIG. 9

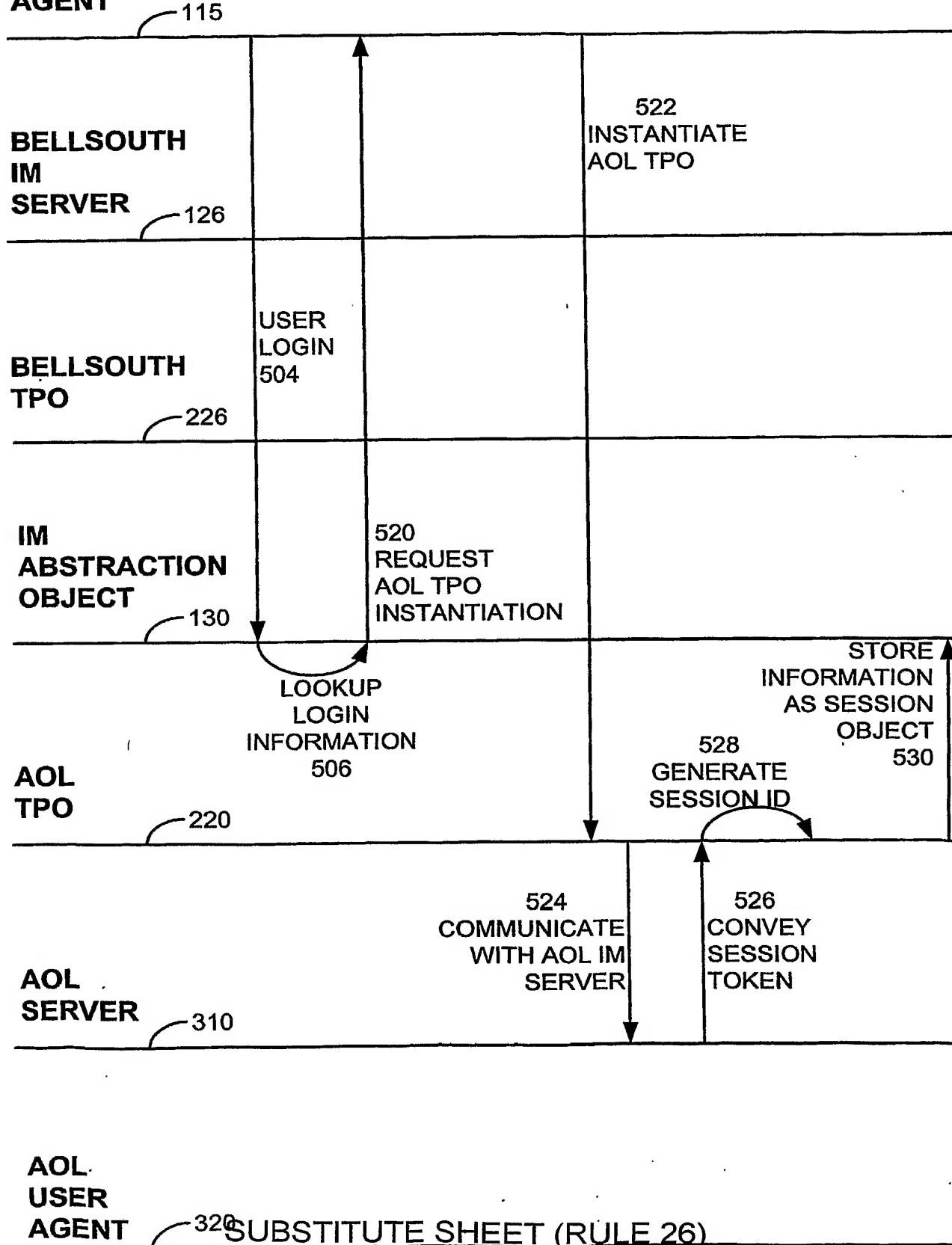


FIG. 10

**BELLSOUTH  
IM USER  
AGENT**

115

**BELLSOUTH  
IM  
SERVER**

126

**BELLSOUTH  
TPO**

227

546  
RELAY XML  
PRESENCE  
INFORMATION

**IM  
ABSTRACTION  
OBJECT**

130

544  
DETERMINE  
SESSION  
USING  
SESSION ID

RELAY  
XML PRESENCE  
INFORMATION  
542

**AOL  
TPO**

POLL  
AOL SERVER  
USING  
AOL-NATIVE  
QUERY FOR  
PRESENCE

220

532  
GENERATE  
AOL NATIVE  
QUERY FOR  
PRESENCE

540  
ENCAPSULATE  
PRESENCE  
INFORMATION  
USING XML

534  
RELAY AOL-  
NATIVE  
PRESENCE  
INFORMATION

538

**AOL  
SERVER**

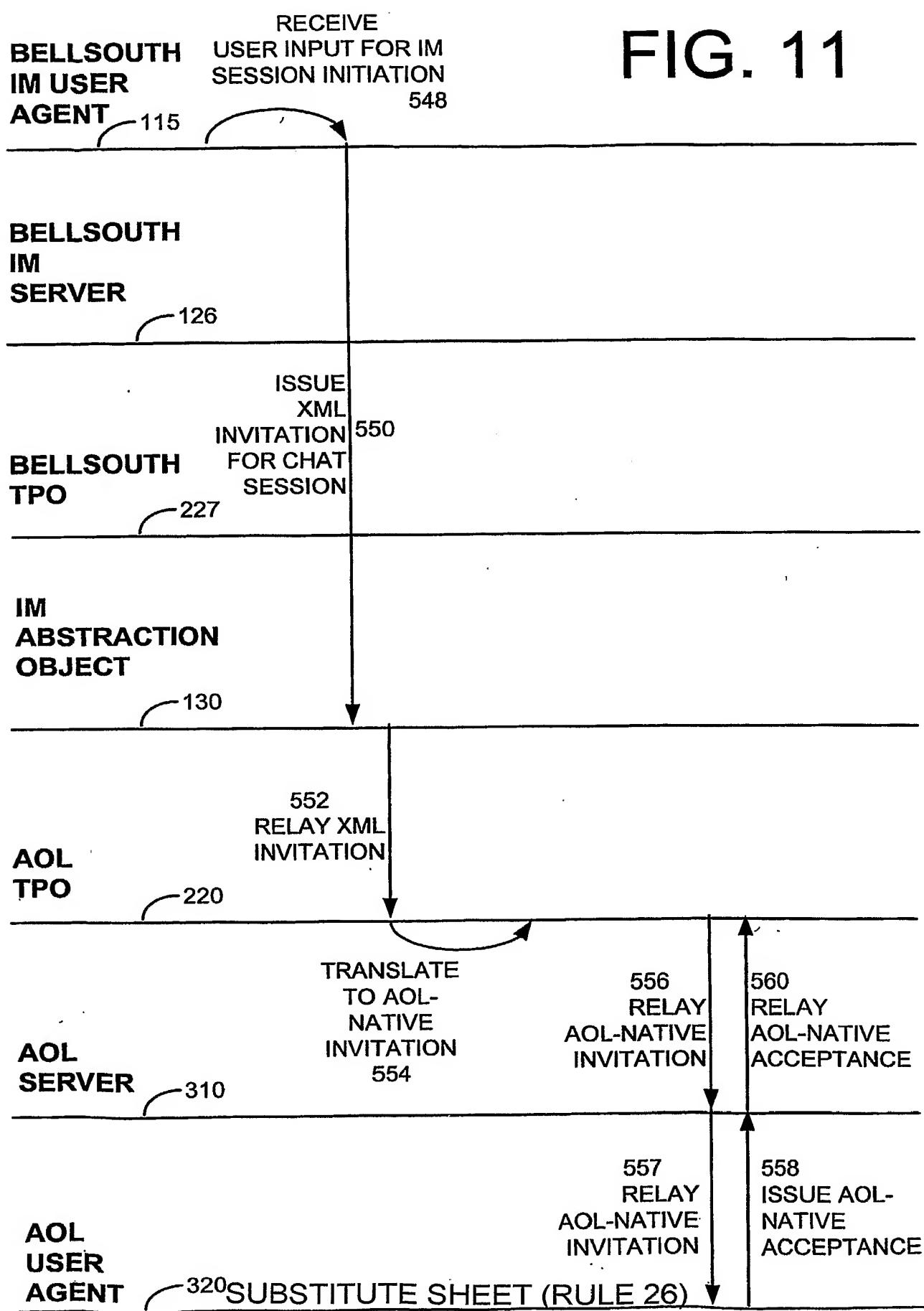
DETERMINE  
PRESENCE  
INFORMATION  
OF CONTACT

536

**AOL  
USER  
AGENT**

320 **SUBSTITUTE SHEET (RULE 26)**

FIG. 11



## FIG. 12

**BELLSOUTH  
IM USER  
AGENT**

115

**BELLSOUTH  
IM  
SERVER**

126

566  
RELAY  
XML  
ACCEPTANCE

568  
CHAT  
SESSION  
ESTABLISHED

**BELLSOUTH  
TPO**

227

XML  
MESSAGE

**IM  
ABSTRACTION  
OBJECT**

130

564  
DETERMINE  
APPROPRIATE  
CHAT  
SESSION

**AOL  
TPO**

220

563  
RELAY XML  
ACCEPTANCE

AOL-NATIVE  
MESSAGE  
570

**AOL  
SERVER**

310

ENCAPSULATE  
AOL-NATIVE  
ACCEPTANCE  
USING XML

562

AOL-NATIVE  
MESSAGE  
572

**AOL  
USER  
AGENT**

320

AOL-NATIVE  
MESSAGE  
574

SUBSTITUTE SHEET (RULE 26)